Developing the Division by Fraction Algorithm

Objective: In this lesson the students will divide fraction equations that have fraction solutions and develop the algorithm for division of fractions.

Materials:

Fraction Bars or Virtual Manipulative – Number line Bars Fractions

<http://nlvm.usu.edu/en/nav/frames_asid_180_g_2_t_1.html?open=activities&from=category_g_2_t_1.html>

* Ask the students to solve the problem: John is mowing grass to earn extra money. He discovers that he only has ¾ of a gallon of gas to put into his mower. He knows it take ½ of a gallon to mow each lawn. How many lawns can he mow?
* Discuss with the students

Can he mow one lawn?

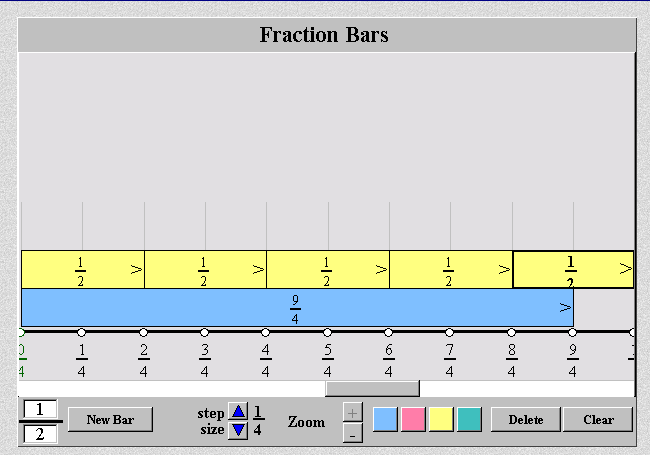
Can he mow two lawns?

Could he mow part of the second lawn? How much of it could he mow.

Help them to see that he could mow 1 and ½ of the next lawn. ¾ ÷ ½ = 1 ½



* Using the fraction numberline- guide students through the solution to the following problem. Manual reads ½ hour every night. His book took him 2 and ¼ hours to read. How many nights did Manual read the book.
  + Have the students set the scale to ¼.
  + Then have them make a bar that is 2 and ¼ long - 9/4 and lay it on the line. How long it take to read the book.
  + Then have them make bars that are ½ long – minutes he reads each night and line the bars up on top of the first bar. The students should see that it will take him 4 nights (4 one-half bars) and half of another night. 4 ½



* Repeat the process for the following problem:

Sophie is making mini pizzas. She has 7/8 of a cup of cheese. The recipe calls for ¼ cups of cheese to make each pizza. How many pizza can she make?

* Solve the following using the number line.
  + 3/10 ÷ 1/5
  + 5/6 ÷1/3
  + 5/8 ÷ ¼
* Developing the Algorithm for Dividing Fractions
  + Review with the students the concept that when dividing fractions you can divide the numerators and the denominators to determine the answer.
    - E.g. 4/6 ÷ 1/3 = 4/2 can be solved as (4 ÷1) /( 6÷2) = 4/2
    - Using this idea have the students solve the following problems
      * 12/14 ÷3/7 =
      * 14/15 ÷ 7/5 =
      * 4/9 ÷ 2/3 =
  + When the students are comfortable with this concept, ask them if this idea would work in solving the problem.
    - 1/3 ÷ ¼.
    - Help them to see that dividing the numerator and denominator would be difficult to understand (1/ ¾ ) Ask: the students to think of the division problem written as a fraction

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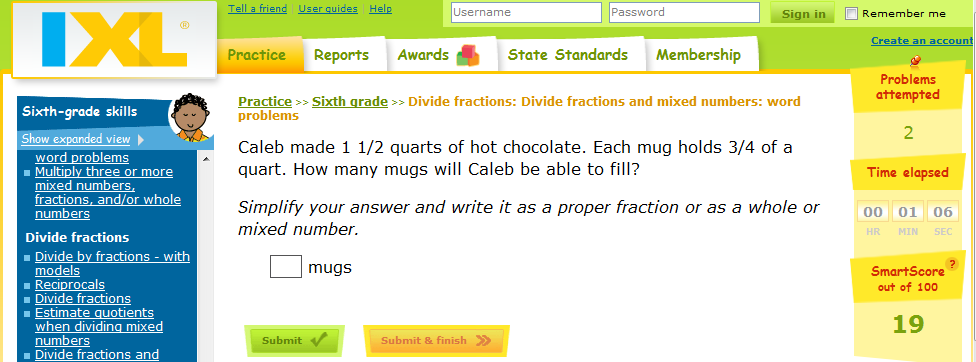
* + - Ask: Is there something that we could do to the ¼ that would make the denominator of this fraction to be equal to one? Guide the students to the idea that they can multiply both the numerator and the denominator by 4/1. The resulting problem would then be 1/3 x 4/1 divided by 1. Have the students solve the problem
    - Repeat the process for the following problems
      * 2/5 ÷ 1/3
      * 3/7 ÷ ½
      * 2/3 ÷ 1/5
      * 3/4÷1/5
    - Have the students practice finding the reciprocal with the following program.

<http://www.ixl.com/math/practice/grade-6-reciprocals>



* + - Ask the students how they would solve the following problem using the algorithm. Guide them to the understanding that the first step is to convert mixed numbers to improper fractions before applying the division algorithm.
      * 2 ½ ÷ ¾
    - Have students practice dividing mixed numbers problems which are embedded in story problem contexts.

<http://www.ixl.com/math/practice/grade-6-divide-fractions-and-mixed-numbers-word-problems>



* + - Worksheet for dividing mixed numbers

<http://www.edhelper.com/math/fractions13.htm>

* + - Assessment : Have the students illustrate how they would solve the following problems
      * 3 ½ ÷ ¾
      * 4 1/3 ÷ 2 1/2